

STANDARD MISSILE-2 (SM-2)



Navy ACAT IC Program

Total Number of Systems:	
SM-2 Blocks I-III B:	11,504
SM-2 Block IV:	162
Total Program Cost (TY\$):	
Blks I-III B:	\$8,772.7M
Blk IV:	\$889M
Average Unit Cost (TY\$):	
Blks I-III B:	\$0.684M
Blk IV:	\$3,069M
Full-rate production:	
SM-2 Blk III B:	4QFY96
SM-2 Blk IV:	Did not occur, LRIP only

Prime Contractor

Raytheon Systems Company
Tucson, AZ

SYSTEM DESCRIPTION & CONTRIBUTION TO JOINT VISION 2020

The Standard Missile-2 (SM-2) is a solid propellant-fueled, tail-controlled SAM fired by surface ships. It was designed to counter high-speed, high-altitude anti-ship cruise missiles (ASCMs) in an advanced ECM environment. Its primary mode of target engagement uses command mid-course guidance with radar illumination of the target by the ship for missile semi-active homing during the

terminal phase. The Block II version of SM-2 includes a signal processor to provide less vulnerability to ECM, an improved fuze and focused-blast fragment warhead that provides better kill probability against smaller, harder targets, and new propulsion for higher velocities and maneuverability. SM-2 can be used against surface targets.

A Block III version of SM-2 provides improved capability against low altitude targets. A modification to this version, designated Block IIIA, extends capability to even lower altitudes. Block IIIA includes a new warhead that imparts greater velocity to warhead fragments in the direction of the target. These SM-2 versions are provided as medium range (MR) rounds that can be fired from Aegis rail launchers, Aegis Vertical Launch Systems (VLS), and Tartar rail launchers. Another MR version, designated Block IIIB, added a passive infrared seeker for an alternate guidance mode. A Block IV version was developed to provide extended range, improved cross-range, and higher altitude capability for Aegis VLS ships, as well as improved performance against maneuvering targets and complex ECM. Block IVA is being developed to provide capability against theater ballistic missiles, although it is planned to retain capability against aircraft and anti-ship cruise missiles providing improved performance against maneuvering targets.

SM-2 Blocks II through IV are long-range interceptors that provide protection against aircraft and anti-ship missiles, thereby expanding the battlespace and jointly contributing to the *Joint Vision 2020* concept of *full-dimensional protection*.

BACKGROUND INFORMATION

Full production approvals for SM-2 Blocks have been as follows: Block II was approved in December 1986; Block III in June 1988; Block IIIA in February 1992; and Block IIIB in September 1996. Block IV was approved for LRIP in May 1995, but further procurement was deferred, pending development of the Block IVA missile (the interceptor for the Navy Area Theater Ballistic Missile Defense (TBMD) program) and Block IVA retention of Block IV capability against anti-air warfare threats. We note that although only early DT/IOT&E of SM-2 Block IV was conducted to support the LRIP decision, its capability has now been demonstrated against supersonic ASCM threat representative targets. However, its capability has not been demonstrated in another important area. The Block IV program was restructured with the intention to proceed to DT&E/OT&E and support a full production decision if technical problems were encountered during development of the SM-2 Block IVA that preclude its retention of Block IV capability (never fully determined) against anti-air warfare threats. While the number of at-sea flight tests is small, those tests have supported partial validation of the model used to predict performance.

OPEVAL of SM-2 Block IIIB was conducted during April 1996, with missile firings by an Aegis cruiser that was completing workup training for deployment. Based on OPEVAL results, we concluded that SM-2 Block IIIB is operationally effective and suitable, although there was degradation in minimum range performance. Our B-LRIP Report was published in August 1996. The minimum range problem was corrected, as demonstrated during FY99 FOT&E.

TEST & EVALUATION ACTIVITY

For Block IIIB, capability in an IR countermeasures environment was investigated during a flight test conducted in October 1999 in conjunction with combat system ship qualification trials of an Aegis

destroyer. Block IIIB flight testing is continuing during normal Aegis combat system ship qualification trials. For Block IV, capability against supersonic targets was investigated during two flight tests conducted in December 1999, also during ship qualification trials of an Aegis destroyer. One of these flights was against a low altitude maneuvering target. A third flight test was conducted at sea in November 2000.

For Block IVA development, two Control Test Vehicle (CTV) flights were conducted. CTV-1 was conducted in June 2000 and CTV-2 was conducted in August 2000, with both at the White Sands Missile Range (WSMR), NM. Primary objectives of the tests were met.

TEST & EVALUATION ASSESSMENT

Based on 1996 OPEVAL results, we concluded that SM-2 Block IIIB is operationally effective and suitable, although there was degradation in minimum range performance. FOT&E conducted in December 1998 verified correction of the problem causing the loss of minimum range performance. Further FOT&E was conducted during April 1999, demonstrating capability against an actual anti-ship cruise missile with a Block IIIB that had undergone a more representative storage period onboard a fleet ship. Additional FOT&E was conducted in July 1999 to characterize and understand the potential of fratricide in certain operational environments. Further tests, intended to characterize and understand capability in specific operational environments, are being planned as engineering tests that will be conducted in conjunction with training events.

There is no formal OT program for Block IV because the Navy chose (as the Block IV EMD program was being executed) to initiate development of an SM-2 interceptor for Theater Ballistic Missiles (TBMs). This TBM interceptor (designated Block IVA) would retain the Block IV capability against anti-ship cruise missiles. Consequently, the Block IV program would not proceed beyond LRIP unless technical problems were encountered in the Block IVA development that precluded its retention of Block IV Anti-Air Warfare (AAW) capability. However, since only early IOT&E was conducted in 1994, Block IV AAW capability was never fully determined. Engineering tests are being conducted in conjunction with combat system ship qualification trials, to determine capability of the LRIP round that will be in the fleet. The initial production qualification test of the Block IV in December 1998 identified a process issue associated with the manufacture of the dorsal cable. The process and material selection of the cable was reviewed and changes were made to the material and process.

The Block IVA program, which is part of the overall Navy Area TBMD program, includes a single flight to demonstrate retention of AAW capability in early FY02 at WSMR, followed by at-sea testing against targets more representative of anti-ship cruise missile threats. As this is being written, there is an unresolved issue regarding the target for the flight test at WSMR. The at-sea testing is considered adequate except for the appearance of a new ASCM threat for which there is no credible surrogate to use as a target. LFT&E is discussed under the Naval Area TBMD section.

